SECTION 07512 - ALTERNATE

PROTECTED BUILT-UP ASPHALT ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

A. This Section includes the following: Built up asphalt inverted roof membrane for Building 8610, CNMS.
   1. Protected membrane, built-up asphalt roofing system.
   2. Roof insulation.

B. Related Sections:
   1. Division 6 Section "Miscellaneous Carpentry" for wood blocking, curbs, cants, and nailers; and wood-based, structural-use roof deck panels.
   2. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
   3. Division 7 Section "Manufactured Roof Specialties."
   4. Division 7 Section "Roof Accessories."
   5. Division 7 Section "Roof Expansion Assemblies."

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.

B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mop-applied roofing asphalt and 75 centipoise for mechanical spreader-applied roofing asphalt within a range of plus or minus 25 deg F measured at the mop cart or mechanical spreader immediately before application.

1.4 PERFORMANCE REQUIREMENTS

A. General: Install a watertight, built-up roofing and base flashing roofing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.

B. FM Listing: Provide built-up roofing, base flashings, and component materials that comply with requirements of FM 4450 and FM 4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
   1. Roofing system shall comply with the following:
      a. Fire/Windstorm Classification: Class 1A-90.

1.5 SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.

B. Shop Drawings: Include plans, sections, details, and attachments to other work, for the following:
   1. Base flashings, cants, and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.

C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to receive the standard roofing manufacturer's warranty.

D. Maintenance Data: For roofing system to include in the maintenance manuals specified in General and Supplementary Conditions.

E. Warranty: Sample copy of standard roofing manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.

F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing similar to that required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product; and who is eligible to receive the standard roofing manufacturer's warranty.

B. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
   1. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108, for application and slopes indicated.

C. Preinstallation Conference: Before installing roofing system, conduct conference at Project Site. Notify participants at least 5 working days before conference.
   1. Meet with Owner; Construction Manager; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
   4. Review loading limitations of deck during and after roofing.
   5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
   6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
   7. Review temporary protection requirements for roofing system during and after installation.
   8. Review roof observation and repair procedures after roofing installation.
   9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, warm, well-ventilated, weathertight location according to roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
   1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.

B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.

C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

D. Protect roofing insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

1.9 WARRANTY

A. Standard Roofing Manufacturer's Warranty: Submit a written warranty, without monetary limitation, signed by roofing system manufacturer agreeing to promptly repair leaks in the roof membrane and base flashings resulting from defects in materials or workmanship for the following warranty period:
   1. Warranty Period: 20 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Built-up Asphalt Roofing:
      a. Firestone Building Products Company.
      b. GAF Building Materials Corp.
      c. Johns-Manville Roofing Systems
   2. Ballast Board Insulation:
      a. T-Clear Corporation

2.2 BASE-SHEET MATERIALS

A. Base Sheet: Unperforated, asphalt-impregnated and –coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.

2.3 ROOF MEMBRANE PLIES

A. Ply Felts: Asphalt-impregnated, glass-fiber felt, complying with ASTM D 2178, Type VI.

2.4 FLASHING MATERIALS

A. Backer Sheet: Unperforated, asphalt-impregnated and –coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.

B. Flashing Sheet: SBS-modified asphalt sheet, granular surfaced; suitable for application method specified; manufacturer’s standard thickness and weight; of granule color and reinforced as follows:
   1. Reinforcing: Glass-fiber mesh or nonwoven glass-fiber mat.

2.5 ASPHALT MATERIALS

A. Roofing Asphalt: ASTM D 312, Type III or Type IV, as recommended by built-up roofing membrane manufacturer.
   1. Label each container or provide certification with ach load of bulk asphalt identifying type of roofing asphalt and indicating softening point, minimum flash point, equiviscous temperature, and finished blowing temperature.

2.6 AUXILIARY MEMBRANE MATERIALS

A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.
   1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, ,of consistency required by roofing system manufacturer for application.

C. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470; designed for fastening base sheets and base flashings and for backnailing ply felts to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.

E. Metal Flashing Sheet: Metal is specified in Division 7 Section “Sheet Metal Flashing and Trim.”

F. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section “Rough Carpentry.”

G. Cants: Perlite board, complying with ASTM C 728.

H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system.

2.7 INSULATION MATERIALS

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Mortar-Faced, Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, 1.8-lb/cu. ft. minimum density, with tongue-and-groove edges on long dimension, and latex-modified cement mortar topping, 3/8 inch thick, 4 lb/sq. ft..
   1. Product: Subject to compliance with requirements, provide "Lightguard" by T. Clear Corporation.

C. Mortar-Faced, Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, 1.8-lb/cu. ft. minimum density, with tongue-and-groove edges on long dimension, and latex-modified cement mortar topping:
   1. Lightweight mortar faced Units: Mortar topping, 3/8 inch thick, 4.5 lb/sq. ft.
      a. Provide lightweight mortar faced units where indicated on Drawings.
      b. Subject to compliance with requirements, provide "Lightguard" by T. Clear Corporation.
   2. Heavyweight mortar faced Units: Mortar topping, 15/16 inch thick, 11 lb/sq. ft.
      a. Provide heavyweight mortar faced units where indicated on Drawings.
      b. Subject to compliance with requirements, provide " Heavyguard" by T. Clear Corporation.

D. Metal Securement System: Perimeter securement flashing and strapping fabricated from stainless steel, a minimum of 0.031 inch thick. Provide fasteners as recommended by mortar-faced insulation manufacturer.
   1. Product: Subject to compliance with requirements, provide System 1 metal securement system manufactured by T. Clear Corporation.

E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.

B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.

D. Do not proceed with installation until after the minimum concrete curing period recommended by roofing system manufacturer.
   1. Test concrete substrate for excessive moisture by pouring 1 pint of roofing asphalt at equiviscous temperature on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if test sample foams or can be easily and cleanly stripped after cooling.

E. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.

F. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-Up Roofing."

B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.

D. Cooperate with inspecting and testing agencies engaged or required to perform services for installing built-up roofing membrane system.

E. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
   1. Provide cutoffs at end of each day's work to cover exposed ply sheets and insulation with a course of coated felt with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.

F. Asphalt Heating: Heat roofing asphalt and apply within plus or minus 25 deg F of equiviscous temperature, unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above the equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25 deg F of flash point.

Discard roofing asphalt maintained at a temperature exceeding 500 deg F for more than 4 hours. Keep kettle lid closed, unless adding roofing asphalt.

1. Aggregate Surfacing: Limit temperature of asphalt flood coat to the minimum required for proper embedment of aggregate and the maximum that will permit retention of required coating weight based on slope of surface.
2. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction. If mopping is applied directly to substrate, tape substrate joints.

3.4 ROOF MEMBRANE INSTALLATION

A. Install ply felts according to roofing system manufacturer's written instructions, starting at low point of roofing system. Align ply felts without stretching. Shingle side laps of ply felts uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water. Extend ply felts over and terminate beyond cants.
   1. Install 4 ply felts.
   2. Application: Embed each ply felt in a solid mopping of hot roofing asphalt applied at rate required by roofing system manufacturer, to form a uniform membrane without ply felts touching each other.

3.5 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
   1. Prime substrates with asphalt primer if required by roofing system manufacturer.
   2. Backer Sheet Application: Install backer sheet and adhere to substrate in a solid mopping of hot roofing asphalt.
   3. Flashing Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt. Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8 inches above roof membrane and 4 inches onto field of roof membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
   1. Seal top termination of base flashing.

D. Install stripping where metal flanges and edgings are set on built-up roofing according to roofing system manufacturer's written instructions.
   1. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of asphalt roofing cement or in a solid mopping of hot roofing asphalt, and extend onto roof membrane.

E. Roof Drains: Set 30-by-30-inch metal flashing in bed of asphalt roofing cement on completed built-up roofing membrane. Cover metal flashing with stripping, extending a minimum of 4 inches beyond edge of metal flashing onto field of roof membrane. Clamp roof membrane, metal flashing, and stripping into roof-drain clamping ring.
   1. Stripping Material: Install not less than 2 plies of roof membrane felt, each set in a continuous coating of asphalt roofing cement or in a solid mopping of hot roofing asphalt.

3.6 PROTECTED MEMBRANE ROOFING INSULATION INSTALLATION

A. Mortar-Faced Extruded Insulation: Install mortar-faced extruded insulation loosely laid, according to manufacturer's written instructions, with tongue-and-groove joints nested. Stagger end joints of adjoining rows and abut insulation.
   1. Install metal securement system as recommended by manufacturer.

3.7 FIELD QUALITY CONTROL

A. Contractor will engage an independent testing and inspecting agency to perform field inspections and quality-assurance tests.
   1. Testing agency will prepare reports stating whether inspected and tested Work complies with or deviates from requirements.

B. Correct deficiencies in or remove and replace roof membrane that inspections and test reports indicate does not comply with specified requirements.
   1. Repair roof membrane that does not comply with specified requirements by re-adhering test specimens back in place and by applying additional plies, equal to the original number of plies specified, over test specimens according to roofing system manufacturer's written instructions.

C. Additional testing, at Contractor's expense, may be performed to determine that corrected Work complies with specified requirements.

D. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
   1. Notify CM 48 hours in advance of the date and time of inspection.

3.8 PROTECTING AND CLEANING

A. Protect built-up roofing membrane from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07512